REMARKS

Claims 1-23 were pending in this application. Claims 7 and 20 stand objected to. Claims 1-6, 8-19 and 21-23 stand rejected. Claims 1, 3, 7, 11, 14-16, and 20 were amended. Claims 24-32 were added. Claims 1-32 remain in the application.

Specification

The specification is objected to by the Examiner:

> 'P. 7, line 28: "the AC 3 coefficients" should have been "the 3 AC coefficients".'

Applicants respectfully disagree. The "AC 3 coefficients" refer to the set of coefficients within an image that are taken from the third AC coefficient location as shown in Fig. 2. This naming convention for the AC coefficients is presented on page 7, lines 10-14 in the application.

Allowable Claims

Claims 7 and 20 stand objected to as being dependent upon a rejected base claim, but allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 7 and 20 have been so rewritten.

Claim Rejections

Claims 1-6, 9, 11, 13-19, 22 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al. (US. 6,101,278) and Russo (US 6,546,122). The rejection stated:

> 'Regarding claim 1, and similarly claims 13 and 14, Chen et al. discloses
>
> > 'a) computing one or more selected DCT coefficients from non-overlapping, contiguous MxN blocks of the decompressed image, beginning at a selected offset; [Fig. 1, numerals 4-6; Fig. 2, numerals 11, 12; Col. 4 ,, lines 18-26, 55-65. Note that the use of a selected offset (usually (0,0) if not specified) when applying DCT is inherent. Note also that the encoder (Fig. 1,

numeral 5) processes images decompressed by the decoder of Fig. 1, numeral 6.]

'b) processing a set of values for each selected DCT coefficient obtained from the blocks of the decompressed image in order to identify a coefficient dispersion; Fig. 3, numeral S302; Fig. 6, numeral S601; Col. 6, lines 25-60 (generate a histogram over all blocks in the image for the coefficients at frequency band (0,1)); Col. 8, lines 58-67 (generate a histogram for each of the AC coefficients). Note that while "in order to identify a coefficient dispersion" indicates an intended use and is not considered by the Office as part of the limitation, it is nonetheless pointed out that the maximal auto-correlation value $D_{0,1}$ subsequently computed from the histogram for the coefficient at (0,1) is considered coefficient dispersion.]

'Chen et al. does not expressly disclose the following, which Russo teaches

'c) repeating steps (a) and (b) for a plurality of offsets within an M x N block in order to identify the offset that minimizes the coefficient dispersion, thereby determining the block boundaries of the decompressed image [Col. 2, lines 27-37 teach the iterative process recited in this limitation. The term "point of maximal match" is interpreted as the point (equivalent to "offset" here) that results in the optimal metric value such as the minimal coefficient dispersion. That the offsets are within an M x N block is obvious because of the cyclic nature of the DCT blocking grid. Again, note that while examined here, the text in this limitation beginning with "in order to" through the end indicates an intended use and is not considered by the Office as part of the limitation.]

'Chen and Russo are combinable because they are from the same field of endeavor of image processing.

'At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Chen et al. with the teaching of Russo by repeating the matching over a number of offsets. The motivation

would have been to find the offset that produces the optimal match, since in template matching it is rare that the starting point yields the optimal match.

'Therefore, it would have been obvious to combine Russo with Chen et al. to produce the invention as specified in claim 1.'

Claim 1 has been amended to state:

1. A method for determining the horizontal and vertical offset for the *M* x *N* DCT block boundaries of a decompressed image produced by a DCT-based compression system, comprising the steps of:

a) computing one or more selected DCT coefficients from nonoverlapping, contiguous *M* x *N* blocks of the decompressed image, beginning at a selected offset;

b) determining a coefficient dispersion for each selected DCT coefficient from a set of values for the respective DCT coefficient obtained from the blocks of the decompressed image;

c) repeating steps (a) and (b) for a plurality of offsets within an *M* x *N* block; and

d) identifying the offset that minimizes the coefficient dispersion, thereby determining the block boundaries of the decompressed image.

The language of amended Claim 1 is supported by the application as filed, notably, the original claims; Figure 9; and page 10, line 7 to page 11, line 18.

Amended Claim 1 requires "determining a coefficient dispersion for each selected DCT coefficient". The rejection states, in relevant part:

'Note that while "in order to identify a coefficient dispersion" indicates an intended use and is not considered by the Office as part of the limitation, it is nonetheless pointed out that the maximal auto-correlation value $D_{0,1}$ subsequently computed from the histogram for the coefficient at (0,1) is considered coefficient dispersion.'

Chen does not support this position. Chen teaches a maximal auto-correlation process that is summarized by Equations 1-3 and discussed at col. 6, lines 26-67. The discussion culminates in the statement:

"where $D_{0,1}$ corresponds to a <u>distance between reconstruction levels</u> of the $(0,1)^{th}$ AC frequency band." (col. 6, lines 57-58, emphasis added).

In other words, Chen states that $D_{0,1}$ represents the distance between the peaks in the DCT coefficient histogram. (See also Chen, Figure 5 and the discussion of DRLs and DDRLs at Chen, col. 8, lines 5-17.) Chen's process of computing the maximal autocorrelation value from the coefficient histogram does not teach or suggest the claimed invention. In fact, the two processes are completely distinct in that a coefficient histogram may have a similar autocorrelation value whether it has a large or small dispersion. For example, Figure 8 of the present application illustrates two different coefficient histograms, one with a small dispersion (solid line) and one with a large dispersion (dashed line). Note the locations of the peaks in both cases. How would Chen's maximal autocorrelation value (the distance between peaks) differentiate between these different histograms?

The rejection relies upon Russo to teach repetition of the process of Chen at different offsets. Assuming Chen and Russo could be combined, the result, a repetition of calculations of the distance between peaks, would not make Chen any closer to the claimed invention.

The combination of Chen and Russo also lacks motivation. The rejection states:

> 'At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Chen et al. with the teaching of Russo by repeating the matching over a number of offsets. The motivation would have been to find the offset that produces the optimal match, since in template matching it is rare that the starting point yields the optimal match.'

The rejection is arguing that the process of Chen needs an "optimal match" according to the method of Russo. This is contrary to Chen, which states:

> 'It has been determined experimentally that if $D_{0,1}$ has a value which is less than or equal to 4, video data for the image has not previously been subjected to a coding operation, i.e., the video data comprises either data captured from an original image or has been "lightly coded".' Using this information, step S302 examines $D_{0,1}$ in order to determine whether to proceed to step S303 or step S305.' (Chen, col. 6, lines 61-67; $D_{0,1}$, as noted in the rejection, is the maximal auto-correlation value)

According to the above quote, Chen was determined experimentally to work as disclosed. Why would Chen ignore an experimental determination and instead add more steps to try and obtain the same result?

Chen also teaches combining multiple results by averaging:

> "Also, since the distances between different peaks in a histogram may not be identical, the invention takes an average of these distances in order to find the most accurate DDRL for the DCT coefficients of the (k,l)th frequency band." (Chen, col. 10, lines 33-37)

Chen also teaches reducing the number of peaks used in calculations of a preferred embodiment. These features further argue that Russo's "optimal" is unnecessary for the method of Chen.

Claims 2-6, 9, 11, and 13 are allowable on the grounds discussed above and as depending from Claim 1. Claims 3 and 11 were amended to track Claim 1.

Claim 14 is supported and allowable on the same basis as Claim 1.

Claims 15-19 and 22 depend from Claim 14 and are allowable on the grounds discussed above and as depending from Claim 14.

Claims 8, 10, 12, 21, 23 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al. (US. 6,101,278) and Russo (US 6,546,122), as applied to claims 1-6, 9, 11, 13-19, 22 above, further in view of Watson (5,629,780).

Claims 8, 10, and 12 are allowable as depending from Claim 1.

Claims 21 and 23 are allowable as depending from Claim 14.

It is believed that these changes now make the claims clear and definite and, if there are any problems with these changes, Applicants' attorney would appreciate a telephone call.

In view of the foregoing, it is believed none of the references, taken singly or in combination, disclose the claimed invention. Accordingly, this application is believed to be in condition for allowance, the notice of which is respectfully requested.

Respectfully submitted,

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If the Examiner is unable to reach the Applicant(s) Attorney at the telephone number provided, the Examiner is requested to communicate with Eastman Kodak Company Patent Operations at
(585) 477-4656.